

ENTRY No. 77
 NAME OF MACHINE MC 16 F DATE 1989-06-15
 INSTITUTION Karolinska Hospital
 ADDRESS Clin Neurophysiology C-lab, Box 60500, S-104 01 Stockholm, Sweden
 TEL 08/729 30 88 TELEX + 46 8339412
 IN CHARGE Göran Printz REPORTED BY Göran Printz

HISTORY AND STATUS

DESIGN, date 1980 Model tests 1980
 ENG DESIGN, date 1980-1981
 CONSTRUCTION, date 1980-1981
 FIRST BEAM, date (or goal) April 1981
 MAJOR ALTERATIONS

COST, ACCELERATOR 6-10.000.000 SEK (1981)
 COST, FACILITY, total

FUNDED BY
ACCELERATOR STAFF, OPERATION AND DEVELOPMENT
 SCIENTISTS ENGINEERS 2
 TECHNICIANS CRAFTS

GRAD STUDENTS involved during year
 OPERATED BY Research staff or Operators
 OPERATION 20-30 hr/wk, On target 15-25 hr/wk
 TIME DISTR. in house 95 % , Outside 5 %
 BUDGET, op & dev
 FUNDED BY

RESEARCH STAFF, not included above
 USERS, in house 40-60 outside
 GRAD STUDENTS involved during year
 RESEARCH BUDGET, in house
 FUNDED BY

MAGNET
 POLE FACE, diameter (compact) 82.8cm, R extraction 33. cm
 R injection cm
 GAP, min 6.6 cm, Field 20.7 kG }
 max 11.9 cm, Field 12.8 kG } at 160.000
 AVERAGE FIELD at R ext 17.4 kG } Ampere turns
 B max/ 1.16

NUMBER OF SECTORS { compact 3 } Spiral, max 40 deg
 { separated }
 SECTOR ANGLE (SSC) deg

TRIMMING COILS 2 sets of valley coils for isochronization
 2 sets of valley coils for harmonics

CONDUCTOR, material and type Cu, indirectly cooled

STORED ENERGY (cryogenic) MJ

POWER: main coils 35 max, kW ; current stability 10⁻⁴
 trimming coils 5 max, kW ; current stability 10⁻⁴

WEIGHT: Fe 17 tons ; coils 0.8 tons

COOLING system Demineralized water

ION ENERGY (bending limit) E/A = 17.2 q²/a² MeV/amu
 (focusing limit) E/A = q²/a² MeV/amu

ACCELERATION SYSTEM

DEES, number 2 ; angle 76-90 deg
 BEAM APERTURE 2.0 cm ; DC Bias kV
 TUNED by, coarse fine flaps
 RF 26 to 26.2 MHz, stable ± 10⁻⁶
 Orb F 13 to 26.2 MHz
 HARMONICS, RF/Orb F, used 1 and 2
 DEE - Gnd, max 40 kV, min gap cm
 STABILITY, (pk-pk noise)/(pk RF volt) < 10⁻³
 ENERGY GAIN, max 160 kV/turn
 RF PHASE, stable to ± 0.5 deg
 RF POWER input, max 30 kW
 FREQUENCY MODULATION, rate /s
 modulator, type
 beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE < 10⁻⁵ Torr or mbar
 PUMPS, No, Type, Size 2 oil diffusion pumps BALZERS
 DIF 250 2 x 1450 l/s
 1 mechanical fore pump BALZERS DUO D60 A 60 m³/h

ION SOURCES

Internal, cold cathode, horizontally mounted

INJECTION SYSTEM

EXTRACTION SYSTEM

Electrostatic deflector, magn. focusing channel

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed m² ; movable m²
 TARGET STATIONS in rooms
 STATIONS served at same time, max
 MAG SPECTROGRAPH, type
 COMPUTER model Texas Instrument PM 550
 OTHER FACILITIES Local radiation shield around
 the cyclotron. 4 targets in a target changer
 mounted on the vacuum chamber

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV)		CURRENT (pμA)	
	Goal	Achieved	Internal	External
p	16	17.2	> 500	> 50
d	8	8.5	> 500	> 50

SECONDARY

(part/s)

BEAM PROPERTIES

MEASURED CONDITIONS
 PULSE WIDTH RF deg pμ A of MeV ions
 PHASE EXC, max RF deg pμ A of MeV ions
 EXTRACT eff % pμ A of MeV ions
 RESOL ΔE/E % pμ A of MeV ions
 EMITTANCE
 (π mm. mrad) { axial } pμA of MeV ions
 { rad }

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS SOLID STATES PHYSICS
 BIOMEDICAL APPLICAT. ISOTOPE PRODUCTIONS 100 %
 for PET Application

REFERENCES/NOTES

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS